

What is claim d is:

1. An apparatus comprising:
an inflatable body having an inner surface and an outer surface;
5 a plurality of support structures connecting said inner surface and said outer surface; and
at least a first antenna element disposed on said outer surface.
2. The apparatus of claim 1 wherein said inner surface comprises the surface of a dirigible.
- 10 3. The apparatus of claim 1 wherein said plurality of support structures comprises a plurality of tubes extending from said inner surface to said outer surface.
- 15 4. The apparatus of claim 3 wherein at least one of said plurality of tubes comprises a coaxial transmission line adapted to transmit signals to and from said at least a first antenna element.
5. The apparatus of claim 1 wherein said at least a first antenna element is one antenna element in a plurality of antenna elements comprising a phased array antenna.
- 20 6. A transmission line comprising a first conductor, said first conductor comprising the metallized interior surface of a first inflatable tube.
7. The transmission line of claim 6 further comprising:
a second conductor disposed within said first inflatable tube; and
a plurality of separation structures disposed in a way such that said inner conductor is spatially separated from said outer conductor.
- 25 8. The transmission line of claim 7 wherein said second conductor is at least one metallized surface of a second inflatable tube, said second inflatable tube having at least a first dimension which is less than a corresponding dimension of said first inflatable tube

9. The transmission line of claim 8 wherein said separation structures comprise a plurality of toroidal bodies disposed within said first inflatable tube, said toroidal bodies having an outer toroidal diameter and further comprising an opening defined by an inner toroidal diameter.

5 10. The transmission line of claim 9 wherein said second inflatable tube passes through the opening defined by said inner toroidal diameter.

11. The transmission line of claim 7 further comprising a pressurized fluid disposed within said first inflatable tube,

10 wherein said pressurized fluid maintains a separation distance between the interior surface of said first inflatable tube and the exterior surface of said second conductor.

12. The transmission line of claim 6 wherein said transmission line further comprises a support structure connecting the interior surface of an inflatable body to an outer surface of said inflatable body, said support structure adapted to maintain a desired distance between said inner surface and said outer surface.

13. A quasi coaxial transmission line comprising:
a conducting transmission line disposed on a first surface of a substrate;

20 a first flexible membrane attached to said first surface;
a second flexible membrane attached to a second surface of said substrate,

25 wherein said first flexible membrane and said second flexible membrane form a quasi-coaxial shield encompassing said conducting transmission line;

30 a pressurized fluid disposed between said first surface and at least one of said first flexible membrane and said second flexible membrane in a way such that a first desired separation distance is maintained between said at least one of said first and second flexible membranes and said conducting transmission line.

14. The quasi coaxial transmission line of claim 13 wherein said at least one of said first flexible membrane and said second flexible membrane comprises both said first flexible membrane and said second flexible membrane.